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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/698,659

10/31/2003

James A. Leistra

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EXAMINER

TSOY, ELENA

ART UNIT

PAPER NUMBER

1762

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

02/16/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/698,659

Applicant(s)

LEISTRA ET AL.

Examiner

Elena Tsoy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 4, 13, 16-23, 28, 30-36, 39 and 40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-12, 14, 15, 24-27, 29, 37 and 38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 2/04, 6/05.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

Election/Restrictions

Applicant's election with traverse of species 1A9iii), 1B(iii), 1C(iv), 2(ii) and 3(i) in the reply filed on 12/21/2006 is acknowledged. The traversal is on the ground(s) that species 1A(iii), 1A(iv) and claim 13 could be searched together without being unduly burdensome to the Examiner. This is not found persuasive because all these species are patentably distinct and, thus, would be burdensome to the Examiner.

The requirement is still deemed proper and is therefore made FINAL.

Claims 1-40 are pending in the application. Claim 33 is withdrawn from consideration because it relates to a position other than elected layer between the anode and membrane. Claims 4, 13, 16-23, 28, 30-36, and 39-40 are withdrawn from consideration as directed to a non-elected invention.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 5-9, 11-12, 14, 24-27, 29, and 37-38 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wessel et al (US 20030008196).

Wessel et al disclose a method for making membrane electrode assembly (See P2), comprising the steps of: providing a membrane electrode assembly comprising an anode and a

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cathode, and a membrane disposed between said anode and said cathode; depositing by *impregnation* techniques (See P28) an electrocatalytic layer **onto each** electrode, *each* electrocatalytic layer (claimed layer between the anode and said membrane) (See Fig. 1; P10-12, 26-32) comprising at least one standard catalyst such as Pt, Pd, Ag, Ru, Ir (See P27) with a peroxide decomposition additive (claimed peroxide decomposition catalyst) comprising at least one element or at least one compound from the groups consisting of metallic transition elements of the Periodic Table of the Elements, i.e. from groups IIIb, IVb, Vb, VIb, VIIb, VIIIb, Ib and IIb, or at one least metallic element or at least one compound from main group 4 (IVa) of the Periodic Table of the Elements, in particular, at least one of the elements Co, Fe, Cr, Mn, Cu, V, Ru, Pd, Ni, Mo, Sn or W (See P31) preferably in heterogeneous form in combination with at least one support substance such C, SiO₂, Al₂O₃, zeolites and heteropoly-acids (See P32), wherein said peroxide decomposition catalyst has selectivity when exposed to hydrogen peroxide toward reactions which form benign products from said hydrogen peroxide (See Paragraphs 13-15).

As to claim 1, it is the Examiner's position that the electrocatalytic layer deposited on the anode would act as oxygen reduction catalyst at anode potential because it is well known in the art that an anode *typically* includes hydrogen oxidation catalyst (See Applicants' specification, P30).

As to claims 5-7, it is the Examiner's position that the electrocatalytic layer deposited on the cathode would act as oxygen reduction catalyst.

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3. Claims 1-3, 5-9, 11-12, 14, 24-27, 29, and 37-38 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Menjak et al (US 20030059664).

Menjak et al disclose a method for making membrane electrode assembly, comprising the steps of: providing a membrane electrode assembly comprising a hydrogen oxidation electrode (anode) (See P13) with a hydrogen oxidation catalyst (See P32) such as graphite (See P84); an oxygen reduction electrode (cathode) (See P13) with an oxygen reduction catalyst such as a layer 35 of carbon (See P91), which may be impregnated with a catalyst material comprising element of Ag, Mn (See P97); and a membrane disposed between said anode and said cathode. The oxygen electrode comprising a peroxide decomposition catalyst layer composed of a carbon matrix and a peroxide decomposer with an active catalyst material chemically impregnated within the carbon matrix between said anode and said membrane (See Fig. 9; P94, 95), the peroxide decomposer comprising Ag (See P 95, 97), wherein said peroxide decomposition catalyst has selectivity when exposed to hydrogen peroxide toward reactions which form benign products from said hydrogen peroxide (See Paragraphs 96-98).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1-3, 5-9, 11-12, 14, 24-27, 29, and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asukabe et al (US 6,335,112) in view of Wessel et al.

Asukabe et al disclose a method for making membrane electrode assembly, comprising the steps of: providing a membrane electrode assembly comprising a fuel electrode for hydrogen oxidation (anode) (See column 3, lines 7-14); an oxidizer electrode for oxygen reduction (cathode) (See column 3, lines 15-29) and a membrane disposed between said anode and said cathode. A hydrogen peroxide decomposition catalyst is added to the membrane and/or to the oxidizer electrode (See column 4, lines 1-5) or to the fuel electrode (See column 4, lines 5-6). The hydrogen peroxide decomposition catalyst comprises oxide catalysts of elements such as Ru, Mn, Zr, Al, Si, Ti (See column 4, lines 15-37), transition metal alloy catalysts of elements such as Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Zr, Nb, Mo, Ru, Rh, Pd, Ta, W, Re, Ir and Pt (See column 4, lines 48-59).

Asukabe et al fail to teach that a hydrogen peroxide decomposition catalyst is deposited as a layer *onto* a membrane or anode or cathode (Claim 1) by impregnating (Claim 33)

Wessel et al teach that a hydrogen peroxide decomposition catalyst may be deposited into or onto electrodes (See P12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have deposited a hydrogen peroxide decomposition catalyst in Asukabe et al onto electrodes with the expectation of providing the desired hydrogen peroxide decomposition since Wessel et al teach that a hydrogen peroxide decomposition catalyst may be deposited into or onto electrodes.

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6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wessel et al/Asukabe et al in view of Wessel et al /Menjak et al/, further in view of Nakawa et al (JP 07024315).

Wessel et al/Asukabe et al in view of Wessel et al /Menjak et al/ are applied here for the same reasons as above. Wessel et al/Asukabe et al in view of Wessel et al /Menjak et al/ fail to teach that carbon is used as a peroxide decomposition catalyst. However, Nakawa et al teach that activated carbon is suitable for the use as a peroxide decomposition catalyst (See Abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used carbon as a peroxide decomposition additive in Wessel et al/Asukabe et al in view of Wessel et al /Menjak et al/ since Nakawa et al teach that activated carbon is suitable for the use as a peroxide decomposition catalyst.

7. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wessel et al/Asukabe et al in view of Wessel et al /Menjak et al.

The cited prior art is applied here for the same reasons as above. The cited prior art fails to teach that the layer of peroxide decomposition catalyst has a porosity of less than or equal to about 20%.

Wessel et al teach that according to the current state of the art, all fuel cells have gas-permeable, porous, so-called three-dimensional electrodes whereas the membrane (electrolyte) present in all fuel cells forms a gas-tight barrier between the two electrodes and ensures ionic current transport in the fuel cell (See P5). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have made a fuel cell in the cited prior art using a layer of peroxide decomposition catalyst having porosity of electrodes or non-

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porous a membrane.

It is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). See also In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant viscosity and velocity parameters (including those of claimed invention) in the cited prior art through routine experimentation in the absence of showing of criticality.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rajendran (US 5981097) teaches that the porosity of catalyst layers 22 and 30 (anode and cathode) is generally in a range of 10 to 99%, preferably 10 to 60% (See column 8, lines 36-40).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is 571-272-1429. The examiner can normally be reached on Monday-Thursday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Elena Tsoy
Examiner
Art Unit 1762

ELENA TSOY
PRIMARY EXAMINER
ETsoy

February 13, 2007